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Title:The influence of a coupling film on ultra-low-loss dielectric measurement using an open resonator
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Abstract:A Fabry-Perot open resonator excited through a coupling film and loaded with a plane-parallel dielectric plate is analyzed. The eigen equation of the field in the resonator is obtained. The quality factors of the resonator with and without a coupling film are compared. The quality factors of the resonator loaded with a plate that is in resonance and off resonance are also compared. It is shown that the difference in coupling losses between a loaded resonator and an unloaded resonator may strongly affect the accuracy in measuring ultra-low loss dielectric material. Some ways to reduce the influence of coupling loss are discussed. Our experiment results are consistent with the numerical analysis. © 2011 Springer Science+Business Media, LLC.